CLAIMS

WHAT IS CLAIMED IS:

1. A method of producing a polyolefin, comprising:
contacting a first stream with at least one removal device to form a second stream, wherein the at least one removal device comprises molecular sieve particles having an average pore size of from 6 Å to 16 Å;
contacting the second stream with a catalyst system to produce the polyolefins in a third stream including the polyolefin and unpolymerized olefins;
separating un-polymerized olefins from the third stream to form a fourth stream;
combining the fourth stream with the first stream to form a mixed stream; and
contacting the mixed stream with the at least one removal device to form the second stream.

2. The method of claim 1, wherein the polyolefin comprises polypropylene.

3. The method of claim 1, wherein the catalyst system comprises a metallocene catalyst system.

4. The method of claim 1, wherein the second stream comprises less than 1 ppm of alcohols, halogen moeties, and organohalides.

5. The method of claim 1, wherein the first stream comprises fresh propylene.

6. The method of claim 1, wherein the first stream comprises alpha-olefin monomers selected from the group selected of ethylene, propylene, and alpha-olefins having from four to 16 carbon atoms.

7. The method of claim 1, wherein the at least one removal device comprises a shell having a first support member.

8. The method of claim 1, wherein the at least one removal device comprises a shell having a first support member in contact with at least a first portion of one or more molecular sieve particles.

9. The method of claim 1, wherein the at least one removal device comprises a shell having a first support member disposed a distance from at least a second portion of the one or more molecular sieve particles.

10. The method of claim 1, wherein the first stream has a flow rate of from 3700 kg/hr to 56000 kg/hr.

11. The method of claim 1, wherein the second stream has a flow rate of from 3700 kg/hr to 56000 kg/hr.

12. The method of claim 1, wherein the third stream has a flow rate of from 3700 kg/hr to 56000 kg/hr.

13. The method of claim 1, wherein the fourth stream has a flow rate of from 2600 kg/hr to 56000 kg/hr.

14. The method of claim 1, in which the metallocene catalyst has an efficiency greater than 3500 gPP/(gCat*hr).

15. The method of claim 1, in which the one or more molecular sieve particles comprise a 13X molecular sieve.

16. The method of claim 1, wherein the second stream comprises less than 0.5 ppm of alcohols, halogen moeties and organohalides.

17. The method of claim 1, wherein the fourth stream comprises 5 ppm or more alcohols, halogen moeties and organohalides.

18. The method of claim 1, wherein the one or more molecular sieve particles have a size of 8 by 14 mesh.

19. The method of claim 1, wherein the metallocene catalyst has an efficiency greater than 3500 gPP/(gCat*hr).

20. The method of claim 1, wherein the metallocene catalyst comprises 1.5 wt % or less active metallocene and 12 wt % or less of metal alkyl scavenger.

21. A method of producing polypropylene, comprising:
contacting a first monomer stream comprising propylene monomers with a supported metallocene catalyst to form a product comprising polypropylene, unpolymerized propylene monomers, organohalides and alcohols;
providing a second monomer stream comprising at least a portion of the product;
passing at least a portion of the second monomer stream through a removal device comprising molecular sieve particles supported by a mesh screen having a pore size of from 6 Å to 16 Å to form a third stream, wherein at least a portion of the alcohols and organohalides from the second monomer stream are absent from the third stream; and
contacting at least a portion of the third stream with a supported metallocene catalyst to form additional polypropylene.

22. A method of producing polypropylene, comprising:
passing a propylene feed stream through one or more removal devices to form a purified monomer stream, wherein the propylene feed stream has alcohols and organohalides in an amount greater than 5 ppm and the purified monomer stream comprises alcohols and organohalides in an amount less than 1 ppm;
contacting the purified monomer stream with a supported metallocene catalyst to polymerize the purified monomer stream and form a product mixture that includes polypropylene macromers or polymers, unreacted or partially reacted propylene monomers, alcohols and organohalides.

23. The method of claim 22, wherein the passing the propylene feed stream through one or more removal devices to form a purified monomer stream comprises combining a first monomer stream and a second monomer stream, the first monomer stream comprising propylene monomers and the second monomer stream comprising unreacted or partially reacted propylene monomers, alcohols and organohalides.

24. The method of claim 22, wherein the passing the propylene feed stream through one or more removal devices to form a purified monomer stream comprises combining a first monomer stream and a second monomer stream, the first monomer stream comprising propylene monomers and the second monomer stream comprising unreacted or partially reacted propylene monomers, and alcohols and organohalides in an amount greater than 10 ppm.

25. The method of claim 22, further comprising removing the polypropylene macromers from the product mixture to form a recycle stream and combining the recycle stream with the propylene feed stream.

26. A method of producing polypropylene, comprising:
contacting propylene monomers with a supported metallocene catalyst to polymerize the propylene monomers and form a product mixture that includes polypropylene macromers or polymers, unreacted or partially reacted propylene monomers, alcohols and organohalides;
removing a portion of the product mixture to form a recycle stream and passing it through a removal device comprising zeolite particles having a pore size of from 6 to 16 Å;
transferring at least a portion of the alcohols and organohalides from the recycle stream to the removal device to provide a purified recycle stream having alcohols and organohalides in an amount of 1 ppm or less; and
contacting at least a portion of the purified recycle stream with the supported metallocene catalyst to form polypropylene.

27. A removal device, comprising:
a shell having a first support member; and
at least a first portion of one or more molecular sieve particles in contact with the first support member.

28. The removal device of claim 27, wherein the molecular sieve particles comprises 13X particles.

29. The removal device of claim 27, wherein the molecular sieve particles are configured to remove at least a portion of alcohols, halogen moeties and organohalides present in an olefin monomer stream passing therethrough.

30. The removal device of claim 27, wherein the molecular sieve particles are configured to reduce a level of alcohols, halogen moeties and organohalides present in an olefin monomer stream passing therethrough from greater than 5 ppm or more to less than 1 ppm.